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CLINICAL THINKING SIMULATOR

Abstract: This article raises the problem of teaching medical students. A large amount of theoretical knowledge that they gain by cramming textbooks in a discipline is contrasted with a lack of practical experience in communicating and handling patients. To solve this problem, it would be appropriate to create a virtual patient that would be able to completely imitate the patient at the doctor's appointment, so that the web-based software product could simulate all possible diseases with all the factors resulting from this. It will allow the student of the medical institution to improve their abilities to diagnose diseases. The use of information support systems to assist doctors in the process of diagnostics using new knowledge and technologies contributes to increasing the effectiveness of treatment and reducing medical errors, as well as to optimizing treatment costs, which will lead to a decrease in the percentage of incorrect diagnoses, and this, in turn, will lead to a decrease of morbidity and deaths during treatment. Communication with the patient, appointment of laboratory and physiological tests, prescription of medications – All this will be implemented in this software web product, which will help to consolidate the theoretical knowledge gained by practical experience, which will completely change how the approach to their training, which should lead to an increase in their skills.

Keywords: web-product, virtual patient, medical student, teaching.

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ТРЕНАЖЕР КЛИНИЧЕСКОГО МЫШЛЕНИЯ

Аннотация: В данной статье поднимается проблема подхода к обучению студентов медицинских учреждений. Большое количество теоретических знаний, которые они получают при зубрежке учебников по той или ной дисциплине и нехватка практического опыта общения и обращения с пациентами. Для решения этой проблемы было принято решения создания виртуального пациента, который бы смог полностью повторить процесс принятия врачом пациента, так программный веб-продукт будет симулировать все возможные виды заболеваний со всеми вытекающими из этого факторами, что позволит студенту медицинского учреждения совершенствовать свои возможности в области диагностики заболеваний. Применение системы оказания информационной поддержки для оказания помощи врачам в процессе диагностики с использованием новых знаний и технологий, способствует увеличению эффективности лечения и снижению врачебных ошибок, а также оптимизации расходов на лечение, что приведет к понижению процента постановки неверных диагнозов, а это приведет к снижению заболеваемости и летальных случаев в ходе лечения. Общение с пациентом, назначение лабораторных и физиологических исследований, назначение медикаментозной продукции – все это будет реализовано в данном программном веб-продукте. Что поможет закреплять полученные теоретические знания практическим опытом, что полностью изменит как подход в их обучении, который должен привести к повышению их квалификации.

Ключевые слова: веб-продукт, виртуальный пациент, студент-медик, преподавание.

In modern medicine, the effectiveness of the work of medical staff and the provision of medical care depends on medical prescriptions and the recommendations of the physician who makes decisions. Therefore, to ensure the quality of medical services, special attention is paid to the problem of rational formulation of the clinical diagnosis of the disease.

The application of information assistance system for helping the doctors in diagnosing patients with the use of new knowledge and technologies enables the increase in the effectiveness of treatment and the reduction of medical errors, and leads to the optimization of treatment expenses, which eventually results in the decrease of percentage of wrong diagnoses and in the lowering of morbidity and lethal cases during the treatment.

This problem is hampered by the lack of sufficient experience of doctors, excessively active treatment in connection with the development of medicine, and lack of resources for advanced training and development of personnel experience thus resulting in duplicate laboratory tests and waste of costly and unnecessary treatments.

If only medical students could use the huge amount of theoretical things that they had learnt at lectures and immediately apply their practical knowledge on a virtual person, whose functionality would be the same as that of the humans, including the body's reaction to laboratory and functional tests. Hence, the students will be able to practice setting the correct diagnosis, with the prescription of further necessary treatment.

Having considered this problem, we decided to create a software web-product that would allow students to go through all stages of patient treatment, starting from the initial examination in the form of dialogues with the patient, till the appointment of laboratory and functional tests, after which the student will be able to see the real indicators of a human body, and, therefore, the whole picture, and to eventually set the correct diagnosis. The students will be able to apply their knowledge in practice, which further will allow them to be more experienced in diagnosing diseases [3].

Experience is the knowledge or mastery of an event or subject gained through involvement in or exposure to it. Aristotle said: «Now from memory experience is produced in men; for the several memories of the same thing produce finally the capacity for a single experience. And experience seems pretty much like science and art» However, «science and art come to men through experience» and «art arises when from many notions gained by experience one universal judgement about a class of objects is produced» [2], and how can you put into memory the moments

that will be useful for you in the future without doing everything at all? F. Bacon also argued that «the universe to the eye of the human understanding is framed like a labyrinth; presenting as it does on every side so many ambiguities of way, such deceitful resemblances of objects and signs, natures so irregular in their lines, and so knotted and entangled. and then the way is still to be made by the uncertain light of the sense, sometimes shining out, sometimes clouded over, through the woods of experience and particulars» [1], and setting a correct diagnosis for a patient is nothing but a labyrinth of the doctor's mind and thoughts, overcoming those winding roads, the passage of which will allow the doctor to draw the whole picture.

As for the software package, which will be a web application, it should be a patient treatment simulator containing therein a predetermined base of diagnoses, a tutor, and all the patient's data resulting from this. In order for an application to be called a treatment simulator, it should have the following set of functions:

- Authorization system;
- System for creating a patient with the option of filling out their medical record;
- System for assigning a particular patient to a certain student;
- Automated treatment process with the possibility to prescribe laboratory and functional diagnostic tests;
- System of giving response to the manipulations with the patient carried out by the student;
- Dialogues with the patient;
- Evaluation of the student's actions on the patient;

This functionality is minimal for releasing the software product to the market.

The result should be a software web product that allows to create a virtual patient with all types of existing diseases, and it will also allow to handle this patient and perform laboratory and functional assignments with further reaction thereto, which will then allow the students to practice in diagnosing all possible diseases. This software will allow the students to combine their theoretical knowledge with practical experience, which will completely change both the approach and the quality of training would-be medical workers.

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